New Species of Ferns from the Río Cenepa Area, Amazonas, Peru

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Abstract. For the forthcoming florula of the Río Cenepa area in the Department of Amazonas, Peru, the following seven new species of ferns (Pteridophyta) are described: *Asplenium eutecnum* (Aspleniaceae); *Cyathea thelypteroides* and *C. windischiana* (Cyatheaceae); *Megalastrum mollis* (Dryopteridaceae); *Tectaria atropurpurea* and *T. microsora* (Dryopteridaceae); and *Thelypteris berlinii* (Thelypteridaceae). A new combination is made for *Cyathea reginae* (Cyatheaceae), which also occurs in this same area; this was previously recognized as a variety of *Cyathea macrosora* and lacks a name at species rank.

Key words: *Asplenium*, Cenepa, *Cyathea*, ferns, *Megalastrum*, Peru, Pteridophyta, *Tectaria*, *Thelypteris*.

Among ferns (Pteridophyta) received as gift-for-identification from staff of the Missouri Botanical Garden are several novelties, which are here described. Names are needed for species to be included in the forthcoming treatment of the vascular plants of the Río Cenepa region on the eastern slopes of the Andes in the Department of Amazonas, Peru (Vásquez et al., in prep.). This area, which previously has not been well collected, is an especially rich region for ferns. The number of pteridophyte species known from the area of the florula is more than 250, nearly a quarter of the species recorded from Peru in the most recently published flora for the country (Tryon & Stolze, 1994). However, the total for Peru has recently been augmented by 137 species, additions since the Tryon and Stolze flora, largely as a result of collections in the past 10 years (Smith et al., 2005).

Asplenium eutecnum A. R. Smith, sp. nov. TYPE: Peru. Amazonas: Prov. Condorcanqui, Dist. El Cenepa, Com. de Tutino, Pumpu-entsa, 340 m, 26 June 1997, *R. Vásquez 24244* w/ *A. Peña, E. Chávez & E. Quiaco* (holotype, HUT; isotypes, MO, NY, UC). Figure 1A.

Asplenio auriculato Swartz affinis, a qua imprimis differt laminis decrescentibus proximaliter, stipitibus brevioribus, pinnis lobatioribus, venis plerumque simplicibus (praeter lobos acroscopicos), apicibus pinnarum obtusis; ab *A. hallii* stipitibus rhachidibusque non lustratis (vs. lustratis), fusco-cinereis (vs. atropurpureis), laminis pinnato-pinnatifidis (vs. pinnato-pinnatisectis, lobo acroscopico saepe ad costam incisis), apicibus laminarum non flagelliformibus, sine gemma ad extremum differt.

Roots wiry, fibrous, giving rise to new plants through root proliferations; rhizomes suberect; rhizome scales dark brown, clathrate, ca. 2–3 × 0.4–0.8 mm, entire; fronds clustered, 8–22 cm long; stipes brown-gray, dull, 0.5–3 cm × 0.5–1 mm, ca. 1/10 of frond length, glabrous or with a few hairlike scales, not or obscurely alate; blades herbaceous, narrowly elliptic, gradually tapered at both ends, 1-pinnate-pinnatifid, 7–20 × 2–5 cm, broadest at the middle, toward the apices with pinnae gradually shorter, narrower, and less deeply lobed, blades lacking flagelliform tips; rachises brownish gray, dull, glabrescent or with sparse hairlike scales, with narrow dark green adaxial wings to ca. 0.3 mm wide; pinnae oblong, ca. 10 to 20 pairs, 1–2.5 × 0.4–1 cm, inequilateral, proximal ones short-stalked to 1 mm, not articulate, excavate basiscopically, truncate and auriculate acroscopically, margins shallowly to deeply lobed, apices obtuse or with a small rounded tooth; veins not or only faintly visible on both sides, mostly unforked except in acroscopic auricles, where they are 2- or 3-forked, tips not visible adaxially; indument abaxially of sparse, tan, appressed, clavate hairs 0.1–0.2 mm long; sori 3 to 6 pairs per pinna, on both sides of midveins; indusia 1.5–5 × 0.4–0.7 mm, margins entire; spores tan, reniform.

Asplenium eutecnum is known from the type and three additional collections; plants are epiphytic, with creeping, proliferous roots suspected of forming colonies by vegetative reproduction. The species epithet is from the Greek eutecknos, blessed with children, alluding to the proliferous nature of the roots that produce new plantlets.

This species appears to be most closely related to *Asplenium auriculatum* Swartz, which differs in having the blades truncate proximally, longer stipes, lowermost pinnae more deflexed and more strongly auriculate, less deeply lobed middle pinnae, veins in pinnae mostly 1-forked on the acroscopic side, and acute pinna apices. *Asplenium auriculatum* is generally found above 800 m (vs. 200–500 m in *A. eutecnum*), over its very broad range, throughout the Neotropics.

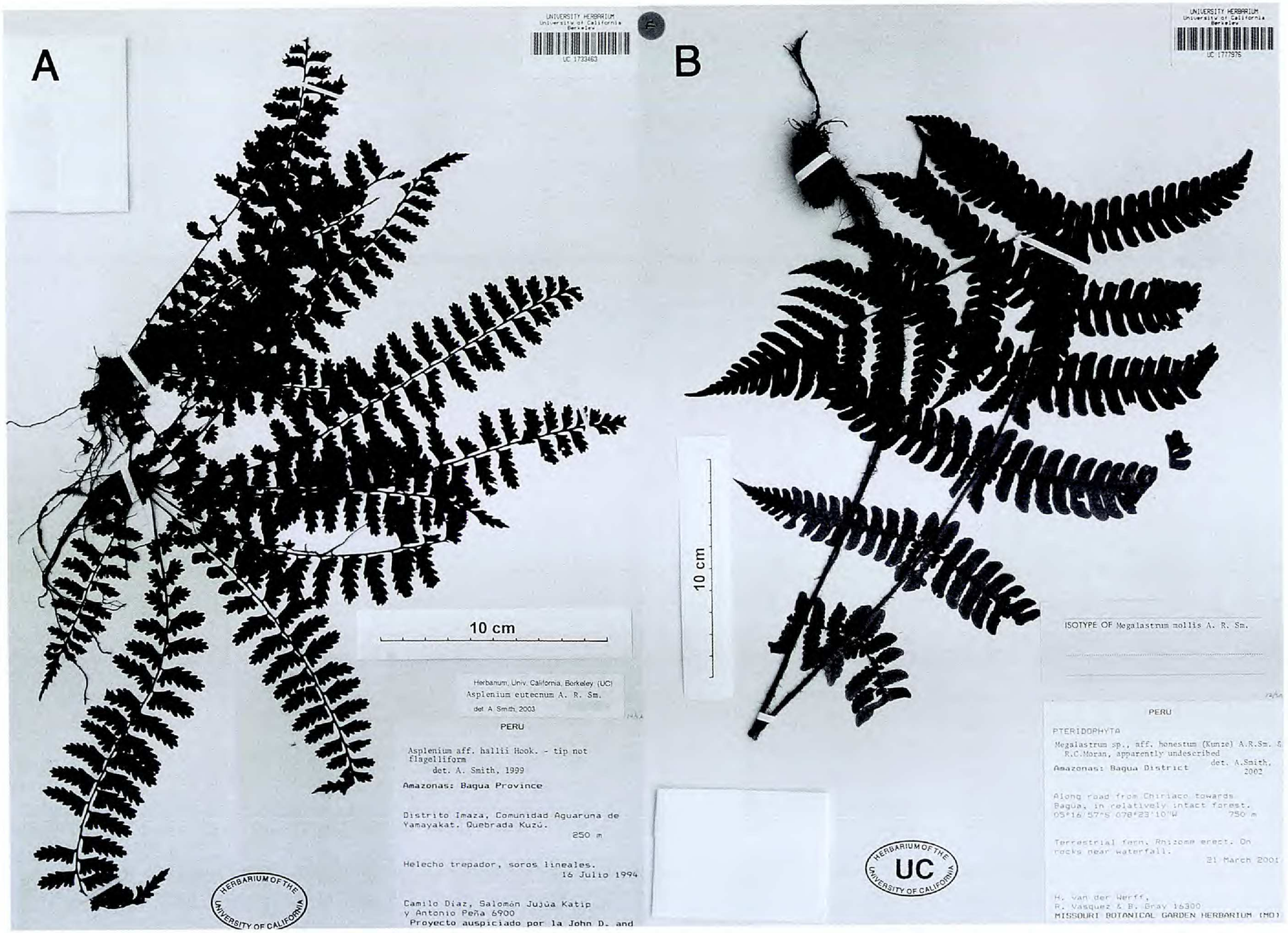

Figure 1. —A. Paratype of *Asplenium eutecnum* A. R. Smith (*Díaz et al. 6900*, UC). —B. Isotype of *Megalastrum mollis* A. R. Smith (*van der Werff et al. 16300*, UC).

There is also similarity to *Asplenium hallii* Hooker. Tryon and Stolze (1993) discussed the paratype, *Mexia 6184*, under *A. hallii*, stating this specimen had similarities to *A. auriculatum* (dull rachises, light brown, ovate rhizome scales, and golden tomentose roots), but otherwise matched *A. hallii*. They speculated on a possible hybrid origin for this specimen because of its presumed morphological intermediacy, barren sporangia, and some malformed spores. *Asplenium hallii* differs from *A. eutecnum* in having darker purple-black, lustrous stipes and rachises, more dissected blades, and flagelliform blade tips bearing a proliferous bud at the tip. The spores of *Rodríguez 1545* (UC) are normal in appearance, small (suggesting that the species is a sexual diploid), and with pronounced spine-like projections, most similar to those of *A. repens* Hooker (Tryon & Lugardon, 1991: fig. 212.30), another Peruvian species that has proliferous roots.

Paratypes. PERU. **Amazonas**: Dist. El Cenepa, Com. de Mamayaque, Quebrada en Cerro Sakee-gaig, *E. Rodríguez R. 1545* w/ *E. Chavez-Agkuash* (HUT, MO, UC); Prov. Bagua, Dist. Imaza, Com. Aguaruna de Yamayakat, Quebrada Kuzú, *C. Díaz 6900* w/ *S. J. Katip & A. Peña* (MO, NY, UC); "Loreto," above Pongo de Manseriche, mouth of Río Santiago, *Y. Mexia 6184* (F, GH, MO, NY, UC, US).

Megalastrum mollis A. R. Smith, sp. nov. TYPE: Peru. Amazonas: Bagua Distr., along rd. from Chiriaco toward Bagua, 21 Mar. 2001, *H. van der Werff 16300* w/ *R. Vásquez & B. Gray* (holotype, MO; isotype, UC). Figure 1B.

A *Megalastro hirsutosetoso* (Hieronymus) A. R. Smith & R. C. Moran pilis longiseptatis catenatis paucioribus in costis costulis venisque in superficiebus ambabus folii, laminis pilis glandulosis ca. 0.1 mm longis inter venas in superficiebus ambabus, paleis stipitum rhizomatumque integris differt.

Rhizomes erect, at the tips with dense, linear-lanceolate, dark brown scales; fronds ca. 75 cm long; stipes to ca. 35 cm long, with spreading, dark brown, linear-lanceolate, entire scales mostly ca. 4–10 × 0.2–0.4 mm; blades ca. 42 × 20 cm, barely bipinnate at the bases, becoming pinnate-pinnatifid in the middle, pinnatifid distally, proximal 1 or 2 pairs of pinnae just slightly shorter than more distal ones; rachises similar to the stipes in indument, but with shorter scales; pinnae ca. 10 pairs, the largest 10 × 3.8 cm, broadest at their bases, the proximal 1 to 4 pairs barely pinnate at the bases; segments (pinnules in larger pinnae) adnate, to 25 × 8 mm, the largest ones adjacent to rachis, shallowly lobed, basal basiscopic pinnule of proximal pinnae slightly longer than the opposing acroscopic pinnule; costae and costules abaxially with linear-lanceolate, dark brown, flat, entire scales mostly 2–3 × 0.1–0.2 mm, also with numerous hyaline, septate, catenate hairs mostly 1–2 mm long; laminar tissue between veins abaxially with short glands and hairs mostly 0.1 mm long or less; costae, costules, and veins adaxially with long septate hairs similar to those on abaxial side of blades, the laminar tissue adaxially with numerous, short-stipitate glands less than 0.1 mm long; veins 1-forked, ending short of the margins (viewed adaxially); sori round, often on each veinlet of forking veins, inframedial, exindusiate.

The epithet is taken from the Latin mollis, soft, alluding to the softly pubescent and rather thin (for *Megalastrum*) blades. *Megalastrum mollis* is known only from the type, growing on rocks near waterfall, at 750 m, in relatively intact forest.

The nearest affinities are probably with *Megalastrum hirsutosetosum* (Hieronymus) A. R. Smith & R. C. Moran, from Ecuador and Peru. That species differs in having denser long-septate, non-catenate hairs on the costae, costules, and veins of both blade surfaces; absence of short glandular hairs on the tissue between veins, both blade surfaces; and in the strongly denticulate stipe base and rhizome apex scales. *Megalastrum hirsutosetosum* also appears to have generally larger fronds (mostly 75–110 cm) and more thickly textured blades. Less closely related species, all with somewhat similar blade dissection, are *M. biseriale* (Baker) A. R. Smith & R. C. Moran (Costa Rica to Bolivia), and *M. honestum* (Kunze) A. R. Smith & R. C. Moran (Ecuador and Peru).

Cyathea reginae (P. G. Windisch) A. R. Smith, comb. et stat. nov. Basionym: *Sphaeropteris macrosora* (Baker) P. G. Windisch var. *reginae* P. G. Windisch, Bradea 1: 374. 1973. *Cyathea macrosora* (Baker) Domin var. *reginae* (P. G. Windisch) A. R. Smith, Ann. Missouri Bot. Gard. 77: 250. 1990. TYPE: Colombia. Vaupes: Raudal Jerijerimo, Río Apacoris, *R. E. Schultes & I. Cabrera 13448* (GH).

This species seems closely related to, but readily distinguishable from, both *Cyathea macrosora* (Baker) Domin var. *macrosora* and variety *vaupensis* (P. G. Windisch) A. R. Smith (see Smith, 1995, for comments). *Cyathea reginae* is the only variant in this complex so far known from Peru, and it differs from closely related congeners by the more well-developed, flabellate indusia that curve upward around the base of each sorus. The costal scales in *C. reginae* are light to dark brown, nearly entire, and bullate basally. *Cyathea macrosora* var. *macrosora* is usually exindusiate (all collections seen), or the

indusia are reduced to one or two narrow, barely discernable lobes (Windisch, 1978), and the costae abaxially bear shining, dark brown, mostly flat, stiffly toothed scales. Variety *vaupensis* also lacks indusia (all specimens seen), or indusia are reduced to a few narrow fragments, and it has more numerous, narrower (ca. 0.5–0.8 mm), sharply bicolored stipe base scales than *C. reginae*. Of the three entities, *C. reginae* is the most widespread, occurring in Guayanan Venezuela, Colombia, Peru, and Amazonian Brazil; *C. macrosora* var. *macrosora* is confined to Guayanan Venezuela and adjacent Mt. Roraima in Guyana; and variety *vaupensis*, the least well-known variant, is known from Colombia and Guayanan Venezuela.

Cyathea thelypteroides A. R. Smith, sp. nov. TYPE: Peru. Amazonas: Bagua Distr., upper slopes & summit of Cerro Tayu, 1030 m, 22 Mar. 2001, *H. van der Werff 16323* w/ *R. Vásquez & B. Gray* (holotype, MO; isotype, UC). Figure 2A.

Cyathea phegopteroide (Hooker) Domin et *C. palaciosii* R. C. Moran maxime similis, sed costis venis laminisque interveniis glabris utrinque, paleis pluribus ovatis secus costas costulasque abaxialiter, laminis subcoriaceis, paleis bicoloribus basi stipitum differt.

Plants terrestrial, with very short trunks, old plants with pendent rhizomes to 2 m long; stipes ca. 10 cm × 4 mm, lacking spines or tubercles, scaly throughout, but especially proximally, the scales lustrous, bicolorous, the body dark brown or blackish brown, margins lighter brown (the transition gradual), ovate-lanceolate, mostly 5–7 × 1–2 mm, the margins with cells flaring outward into minute, closely set teeth or papillae, scale tips acute, stipes otherwise glabrous or with minute glands less than 0.1 mm long, lacking small scales (scurf); blades subcoriaceous, pinnate-pinnatifid except at apices, ca. 30 × 11 cm, proximal pinna-pair slightly shorter than the next, blade apices pinnatifid; rachises with scattered scales like those of the stipes but smaller and narrower, tan to brown, concolorous; pinnae sessile or proximal 1 or 2 pairs short-stalked to 2.5 mm, to 5.5 cm × 1.6 mm, incised ca. 3/4 the distance to the costae, basal pair of segments on proximal pinnae slightly reduced, with up to ca. 13 pairs of segments, these 3 mm wide at sinuses, entire, tips rounded; costae abaxially with persistent, lustrous, light brown, ovate, flat scales mostly 1–3 × 1–2 mm, the smaller scales of the costae and most of the scales on the costules strongly inrolled at their bases (bullate), costae lacking hairs or hairs sparse, adaxially the costae with falcate, septate, hyaline hairs, blades otherwise glabrous; veins free, mostly 1-forked, ± glabrous; sori ± medial to inframedial, borne at vein forks; paraphyses moderately numerous, reddish brown, persistent, about the same length as sporangial capsules; indusia absent.

Cyathea thelypteroides is named for its similarity in blade form to many species of *Thelypteris* and is known only from the type.

This species is most similar in blade size and dissection to *Cyathea phegopteroides* (Hooker) Domin and *C. palaciosii* R. C. Moran (Moran, 1994), differing from these in the nearly glabrous blades abaxially and adaxially, the more abundant and ovate scales on the costae and costules abaxially, the subcoriaceous blades, and more strongly bicolored stipe scales. *Cyathea concordia* B. León & R. C. Moran (León & Moran, 1996), known only from the type from Cordillera del Cóndor, Amazonas, Peru, is similar to *C. thelypteroides* in blade size and dissection, but differs in the indusiate sori (indusia sphaeropteroid) placed on mostly simple veins, pubescent veins abaxially, and lighter colored, nearly concolorous stipe base scales. It seems likely that the small-fronded, pinnate-pinnatifid, exindusiate species of *Cyathea*, including *C. thelypteroides*, *C. phegopteroides*, *C. palaciosii*, and *C. bipinnatifida* (Baker) Domin, form a natural group in the Andes.

Cyathea windischiana A. R. Smith, sp. nov. TYPE: Peru. Amazonas: Bagua Distr., Cerro Tayu, ca. 1 hr. from Chiriaco, 800 m, 19 Mar. 2001, *H. van der Werff 16207* w/ *R. Vásquez & B. Gray* (holotype, MO; isotype, UC). Figure 2B.

Ex affinitate *Cyatheae macrocarpae* (C. Presl) Domin indusiis hemiteliis, truncis brevissimis, frondibus minoribus ca. 75 cm longis, laminis pinnatopinnatifidis supra basin, paleis stipitum stramineis vel albidis, marginibus ciliatis apicibus fuscis tortuosis, paleis costarum costularumque pluribus latioribus distinguenda.

Plants terrestrial, with very short trunks; stipes ca. 22 cm × 5 mm, scaly throughout, but especially proximally, the scales whitish to stramineous, mostly 5–12 × 0.5–1.5 mm, the margins with cells flaring outward into hairlike projections, scale tips, especially at stipe bases, often dark castaneous or atropurpureous, or banded with a darkened, often tortuous file(s) of cells in the middle that extends into attenuate or filiform scale tips, stipes otherwise with some matted, flexuous, septate hairs, lacking spines, tubercles, or small scales (scurf); blades pinnate-pinnatifid except at the very base, ca. 50 × 20 cm, proximal 1 or 2 pinna-pairs with the acroscopic segment (pinnule) free or nearly so, sessile or somewhat adnate, to 15 × 7 mm, crenulate, basiscopic segment nearly free and about the same size, blades gradually reduced distally to pinnatifid apices; pinnae

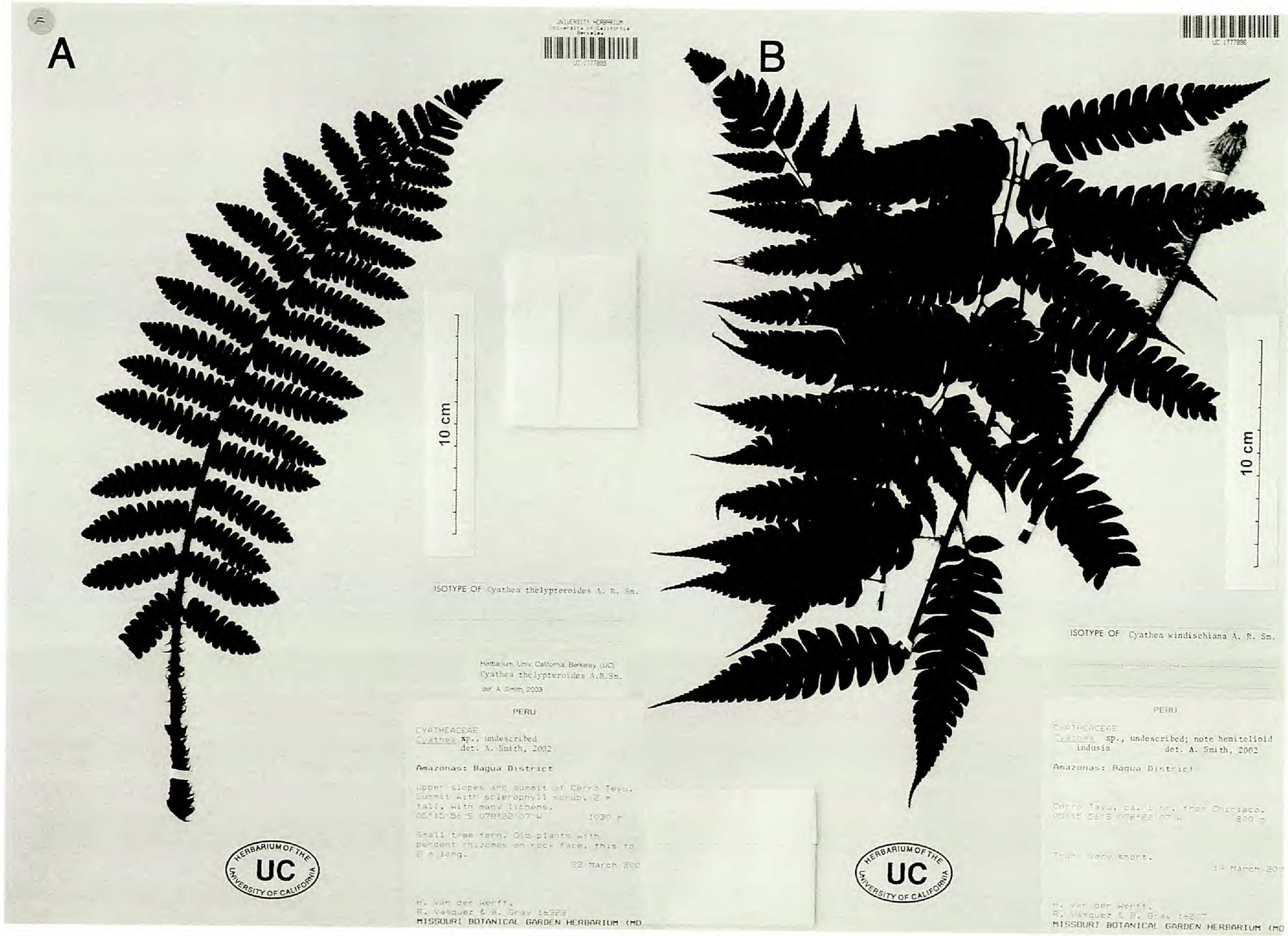

Figure 2. —A. Isotype of *Cyathea thelypteroides* A. R. Smith (*van der Werff et al. 16323*. UC). —B. Isotype of *Cyathea windischiana* A. R. Smith (*van der Werff et al. 16207*. UC).

to ca. 13 × 3.5 cm, long-stalked, the proximal pinnae stalked ca. 12 mm, middle ones ca. 6 mm, broadest at or near the bases, gradually tapered toward the tips, with ca. 15 pairs of segments, these 4–7 mm wide at sinuses, crenulate toward rounded to often acute tips; costae and costules abaxially with persistent, stramineous to tan, lanceolate or ovate-lanceolate, flattish scales to ca. 1.5 × 0.4 mm, scales with bases toothed, often with a filiform tip, adaxially the costae with falcate, acicular, often darkened hairs, blades otherwise glabrous; veins free, 1- or 2-forked in larger segments, simple or 1-forked below the middle in smaller segments, ± glabrous; sori ± medial, on the acroscopic veinlet of a 1-forked vein; paraphyses numerous, in a dense mass, exserted and persistent; indusia brown, hemitelioid, flabellate, entire at the margins, borne at the proximal base of each sorus.

This species is known only from the type and is named for Paulo Gunter Windisch, Brazilian pteridologist who monographed this group of species (Windisch, 1978).

Cyathea windischiana is perhaps related to *C. macrocarpa* (C. Presl) Domin, which is thought to be restricted to the Venezuelan Guayana, Guyana, Surinam, and French Guiana (Windisch, 1978; Smith, 1995), but the relationship is not close. The latter differs in having much larger fronds, trunks probably taller (to 2 m), blades bipinnate-pinnatifid, longer, white or stramineous stipe base scales that lack apical dark mid-bands or tips, and much less numerous, generally narrower, costal and costular scales. There is a more distant relationship of *C. windischiana* to *C. rufescens* (Mettenius ex Kuhn) Domin, known only from near Tarapoto, Peru, and to *C. macrosora*, widespread around the fringes of the Amazon basin (cf. Windisch, 1978). With all of these species, *C. windischiana* corresponds in the reduced, hemitelioid indusia, although in *C. macrosora* the indusia are even more reduced, very small and flabellate or even essentially absent. This group of species also has numerous, exserted soral paraphyses.

Tectaria atropurpurea A. R. Smith, sp. nov. TYPE: Peru. Amazonas: Bagua Distr., Distr. Imaza, Com. Aguaruna de Putuim, 480 m, 19 June 1996, *E. Rodríguez R. 1122* w/ *P. Atamain, E. Chavez-Agkuash & W. Atamain* (holotype, HUT; isotypes, MO, NY not seen, UC). Figure 3A.

A *Tectaria incisa* Cavanilles stipitibus rachidibus costisque atropurpureis, lustratis, pinnis longidecurrentibus praeter pari basali, costis costulis venis interveniisque pilis dispersis septatis 0.2–0.5 mm longis differt.

Rhizomes erect, apices not seen; fronds 60–115 cm long; stipes to 60 cm × 4–7 mm, atropurpureous and lustrous, glabrescent, scales not seen at bases, perhaps abraded, also with dense, often abraded, minute hairs ca. 0.1–0.15 mm long; blades ca. 35–45 × 30 cm, with ca. 3 pairs of lateral pinnae, these strongly ascending ca. 45° to the rachises, 1 or 2 pairs free, distal pairs strongly and long-decurrent onto the rachises; blade apices with 2 to 4 pairs of basal lobes, long-decurrent nearly to adjacent pair of lateral pinnae; rachises with scattered spreading hairs 0.3–0.6 mm long, glabrescent, without scales; buds lacking in axils of pinnae; lateral pinnae to 25 × 8 cm (excluding basal lobes), proximal pair on each blade usually with a single basal basiscopic lobe ca. 10 cm long; costae abaxially atropurpureous, lustrous, costae, costules, veins, and laminar tissue between veins with scattered septate hairs 0.2–0.5 mm long, scales lacking, laminar tissue and veins adaxially glabrous; veins highly reticulate and forming areoles with included, excurrent and recurrent, simple or often forked veinlets, lateral pinnae and apical pinna, as well as larger lobes of these, with ± parallel main lateral veins; sori in 2 regular rows between main lateral veins, to ca. 1.5 mm diam., each with a relatively large, atropurpureous, round-reniform, glabrous, lustrous indusium to 1 mm diam.

The epithet derives from the Latin prefix atro-, dark or black, and purpurea, purple, alluding to the color of the stipes, rachises, and costae. *Tectaria atropurpurea* is known from the type and one other collection from the same area, as well as one collection from eastern Ecuador, all in primary forests.

In the *Pteridophyta of Peru* (Tryon & Stolze, 1991), this will key to *Tectaria incisa* Cavanilles, but *T. atropurpurea* is easily distinguished by the purple-black, burnished stipes, rachises, and costae; the long-decurrent suprabasal pinnae; and by the costae, costules, veins, and tissue between veins usually with scattered, septate hairs 0.2–0.5 mm long. However, the sole collection seen from Ecuador has only sparse hairs abaxially, with hairs less than 0.3 mm long. Both species have sori in two regular rows between the main lateral veins. Several other species of *Tectaria* Cavanilles also have atropurpureous axes, but these all differ in various details: *Tectaria brauniana* (H. Karsten) C. Christensen, from Nicaragua to Bolivia, has free veins, bipinnatifid, more dissected blades, and usually only the stipes and proximal part of rachises atropurpureous; *Tectaria subebenea* (H. Christ) C. Christensen, from Nicaragua to Panama, has 2-pinnate-pinnatifid blades; *T. haynaldii* (Sodiro) C. Christensen, from Ecuador and Colombia, has 4 to

Figure 3. —A. Isotype of *Tectaria atropurpurea* A. R. Smith (*Rodríguez et al. 1122*, UC). —B. Isotype of *Tectaria microsora* A. R. Smith (*Rodríguez R. et al. 967*, UC).

6 rows of very small, exindusiate sori between the main lateral veins, and only 1 or 2 pairs of lateral pinnae; and *T. microsora* A. R. Smith, from Peru, described and contrasted below.

Paratypes. ECUADOR. **Pastaza**: Pastaza Canton, north of Puyo, in park by river, *A. Fay & L. Fay 3738* (MO, UC). PERU. **Amazonas**: Prov. Bagua, Soldado Oliva, carr. entre Bagua–Imaza, 660 m, *C. Díaz 10604* w/ *M. Huamán, F. Salvador, O. Portocarrero & M. Medina* (MO, UC).

Tectaria microsora A. R. Smith, sp. nov. TYPE: Peru. Amazonas: Bagua Distr., Distr. Imaza, Com. Aguaruna de Putuim, 12 June 1996, *E. Rodríguez R. 967* w/ *P. Atamain, E. Chavez-Agkuash & W. Atamain* (holotype, HUT; isotypes, MO, NY not seen, UC). Figure 3B.

A *Tectaria antioquoiana* (Baker) C. Christensen soris exindusiatis vel indusiis parvulis occultis, stipitibus rhachidibusque atropurpureis vel atrobrunneis (vel interdum brunneolis) lustratis, pilis stipitum rhachidum costarum venarum plerumque densis tenuibus 0.1–0.15 mm longis, carentibus gemmis differt.

Rhizomes suberect, scaly at apices; fronds 55–100 cm long; stipes 30–60 cm × 4–7 mm, atropurpureous to dark brown, often lustrous, glabrescent, at bases with sparse, ± appressed, dark brown, ovate-lanceolate scales ca. 2–3 × 0.5–1 mm, these often abraded, also with dense, often abraded, minute hairs ca. 0.1–0.15 mm long; blades 28–40 × 23–30 cm, each with a single pair (less often, 2 pairs) of free lateral pinnae, blade apices with a single pair of large basal lobes, long-decurrent nearly to the adjacent pair of lateral pinnae; rachises light to dark brown, occasionally atropurpureous, with dense spreading thin hairs 0.1–0.15 mm long, sometimes glabrescent, without scales; buds lacking in axils of proximal pinnae; lateral pinnae 17–22 × 6–8 cm (excluding any lobes), usually with a single basal basiscopic lobe 9–12 cm long; costae abaxially atropurpureous to brown-black, occasionally lighter brown, the costae, costules, veins, and sometimes laminar tissue between veins with usually dense hairs 0.1–0.15 mm long, scales lacking, laminar tissue and veins adaxially glabrous; veins highly reticulate and forming areoles with included, excurrent and recurrent, simple or often forked veinlets, the 2 lateral pinnae and apical pinna, as well as large lobes of these, with parallel main lateral veins; sori in 4 to 8 very irregular and hardly discernible rows between main lateral veins, ca. 1 mm diam. or less, seemingly exindusiate or with a ± hidden, marginally fimbriate indusial fragment that is often reduced to a few hairlike structures.

The epithet is taken from the Greek prefix micro-, small, and -sorus, sori. *Tectaria microsora* is known from 13 collections, all from the eastern side of the Ecuadorian and Peruvian Andes, collected in primary forests, at 200 to 800 m elevation.

In the *Pteridophyta of Peru* (Tryon & Stolze, 1991), this will key to *Tectaria antioquoiana* (Baker) C. Christensen, from Nicaragua to Peru. *Tectaria antioquoiana* differs in having indusia usually (always?) present, usually larger sori 1–2 mm in diameter, stipes and rachises dull, stramineous to light brown or purplish brown, and usually by the presence of proliferous buds in the axils of proximal pinnae. The sori in *T. microsora* are unusually small for a species of *Tectaria* (hence the species epithet), seemingly exindusiate or with very small, hidden, fimbriate indusia, and arrayed in 4 to 8 very irregular rows between the main lateral veins, all characteristics distinguishing it from *T. atropurpurea*, newly described above. In soral features, *T. microsora* is similar to *T. draconoptera* (D. C. Eaton) Copeland, from Nicaragua to Bolivia, except that the latter is truly exindusiate and never with small fimbriate indusia. *Tectaria draconoptera* also differs in the pinnatisect blades with all pinnae connected by the alate rachis, lighter brown stipes and rachises, and the glabrous axes and blades. *Tectaria microsora* has a usually dense covering of short, fine hairs 0.1–0.15 mm long on the axes and occasionally also on tissue between the veins abaxially.

Paratypes. ECUADOR: **Napo**: Yasuní Natl. Park, ca. 1.5 km E of bridge over Río Tiputini E of biological station, Transect 2, *R. C. Moran 6105*, w/ *H. Tuomisto, K. Ruokoleinen & A. Poulsen* (NY); Parque Nacional Yasuní, Estación Cientifica Yasuní, por el Río Tiputini, 1.1 km E of biological station, *R. C. Moran 6026*, w/ *H. Tuomisto, K. Ruokoleinen & A. Poulsen* (NY); Aguarico, Reserva Etnica Huaorani, carretera y oleoducto de Maxus en construcción km 92–96, *M. Aulestia & O. Gonti 1982* (MO, NY, UC); Reserva Biológica Jatum Sacha, Río Napo, 8 km abajo de Misahuallí, *C. Cerón 589* (MO, NY, UC). **Pastaza**: Pastaza Canton, 75 km E de Puyo, *E. Gudiño 805*, w/ *C. Quelal & N. Caiga* (MO, NY, UC); Pastaza Canton, Pozo petrolero "Moretecocha" de ARCO, *E. Gudiño 1327* (MO, UC); Pozo petrolero Villano 2 de ARCO, *F. Hurtado 2916* (MO, UC). PERU. **Amazonas**: Prov. Condorcanqui, Distr. El Cenepa, región Nororiental del Marañon, Río Cenepa, Com. Tutino, *R. Vásquez 18404* w/ *C. Diaz, J. Mostacero, F. Mejia & J. Ampam* (MO, NY, UC); Prov. Bagua, Distr. Imaza, region del Marañon, Com. de Yamayakat, Quebrada Kusu-Chapi, Río Marañon, *R. Vásquez 19644* (MO, NY, UC), *E. Rodríguez R. 288* (HUT, MO, UC); Bagua Distr., along road from Chiriaco toward Bagua, *H. van der Werff 16260* (MO, UC); Prov. Bagua, Mesones–Muro Hwy. below Montenegro 18 km, Km 296 E of Olmos, E side of Abra Huahuajin Pass, *P. C. Hutchison & J. K. Wright 3649* (NY, UC). **Pasco**: Oxapampa Prov., Palcazu Valley, Iscozacin, along Palcazu River, *J. Salick 7213* (NY).

Thelypteris berlinii A. R. Smith, sp. nov. TYPE: Peru. Amazonas: [Bagua Distr.], Río Cenepa,

trailside on outskirts of Huampami, 940 ft. [ca. 300 m], *B. Berlin 201* (holotype, UC; isotypes, F, MO).

A *Thelypteride biformata* (Rosenstock) R. M. Tryon pilis brevioribus antrorsis abaxialiter, carentibus pilis stellatis secus costas abaxialiter, frondibus majoribus, pinnis minus incisis, venis pluribus in quoque segmento differt.

Rhizomes unknown, probably suberect; fronds monomorphic; stipes not seen, probably to 50 cm long or more; blades dark green, herbaceous, not verrucose, incomplete, probably to ca. 50 cm long, apices abruptly reduced, somewhat pinna-like, pinnatifid; rachises with dense, stellate hairs ca. 0.1 mm long, lacking long acicular hairs; pinnae 9 or more pairs, to 18 × 3.2 cm, short-stalked to 3 mm, incised ca. 0.5–0.6 the way to the costae, proximal pinnae truncate and only slightly narrowed at their bases, a distal pinna sometimes bearing a small bud in the axil; segments suboblique, subfalcate, rounded at apices, ca. 4–6 mm wide; veins to 18 pairs per segment, lowermost 2 or 3 pairs from adjacent segments connivent at sinuses; indument abaxially of numerous simple, antrorse hairs 0.1–0.3 mm long on costae, costules, and veins, tissue between veins glabrous or with sparse short hairs, stellate hairs lacking except on rachises adaxially and on rachises and bases of costae abaxially, laminar tissue and veins adaxially glabrous; sori medial; indusia round-reniform, tan; sporangia glabrous or with a few minute hairs from the sporangial stalks.

This species is named for the collector, Brent Berlin, who researched the ethnobotany of the Aguaruna Indians from this area and who made some of the earliest collections of plants in the Río Cenepa region. *Thelypteris berlinii* is known only from the holotype and two isotypes, all incomplete specimens lacking the proximal part of the frond and rhizome. This gathering was mentioned by Smith (in Tryon & Stolze, 1992: 66) as a possible undescribed species.

Thelypteris berlinii appears to be most closely related to *T. biformata* (Rosenstock) R. M. Tryon, differing from that in the short, antrorse costal hairs abaxially, the lack of stellate hairs and long acicular hairs on the costae abaxially, larger frond size (probably exceeding 1 m), more shallowly incised pinnae (ca. 1/2 their width, vs. ca. 3/4 their width in *T. biformata*), and more numerous pairs of veins per segment (to 18 pairs). The blade apex is subconform, not quite confluent with the more proximal pinnae, but broader at the base and dissimilar from the lateral pinnae. A small bud has been seen in the axil of a pinna just below the apex in the holotype.

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